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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/851,018	05/08/2001	William K. Lam	(P5426) SUNM-041XX	3328
25181	7590	02/10/2005	EXAMINER	
FOLEY HOAG, LLP PATENT GROUP, WORLD TRADE CENTER WEST 155 SEAPORT BLVD BOSTON, MA 02110			NAHAR, QAMRUN	
			ART UNIT	PAPER NUMBER
			2124	

DATE MAILED: 02/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/851,018		LAM ET AL.	
	Examiner		Art Unit	
	Qamrun Nahar		2124	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the amendment filed on 9/22/04.
2. The objections to the drawings are withdrawn in view of applicant's submission of replacement sheets.
3. The objections to the specifications are withdrawn in view of applicant's amendment and remarks/arguments.
4. The rejection under 35 U.S.C. 101 to claims 1-8 is withdrawn in view of applicant's amendment and remarks/arguments.
5. The rejection under 35 U.S.C. 112, second paragraph, to claims 2 and 10 is withdrawn in view of applicant's amendment and remarks/arguments.
6. Claims 1, 3-5, 9, 11-13, 17 and 19 stand finally rejected under 35 U.S.C. 102(e) as being anticipated by Biggerstaff (U.S. 6,745,384), see below and the previous Office Action, Mailed on 6/23/04, par. 12-20.
7. Claims 6-8 and 14-16 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Biggerstaff (U.S. 6,745,384) see the previous Office Action, Mailed on 6/23/04, par. 24-25 and 27-29.
8. Claims 2 and 10 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Biggerstaff (U.S. 6,745,384) in view of Schreiber (U.S. 6,438,747), see below.
9. Claim 18 stand finally rejected under 35 U.S.C. 103(a) as being unpatentable over Biggerstaff (U.S. 6,745,384) in view of Goebel (U.S. 6,009,272), see the previous Office Action, Mailed on 6/23/04, par. 30.

Art Unit: 2124

Admitted Prior Art

10. If Applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, Applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well-known statement was made. This is necessary because the Examiner must be given the opportunity to provide evidence in the next Office action or explain why no evidence is required. If the Examiner adds a reference to the rejection in the next action after applicant's rebuttal, the newly cited reference, if it is added merely as evidence of the prior well known statement, does not result in a new issue and thus the action can potentially be made final.

The object of the following well known statements is taken to be admitted prior art:

See the previous Office Action, Mailed on 6/23/04, par. 24.

Response to Amendment

Claim Rejections - 35 USC § 102

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

12. Claims 1, 3-5, 9, 11-13, 17 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Biggerstaff (U.S. 6,745,384).

Art Unit: 2124

Per Claim 1 (Amended):

Biggerstaff discloses:

determining an upper bound and a lower bound for a loop index within said variable looping statement (Fig. 33, line 1; column 32, lines 29-43);

determining a condition that must be satisfied, said condition reflecting any conditions within an initial expression and an exit expression of said variable looping statement (Fig. 33, line 3); and

forming a constant looping statement, wherein said upper bound and said lower bound define a range of values for a loop index within said constant looping statement (Fig. 33, line 1), wherein said constant looping statement includes a nested conditional statement which tests said determined condition (Fig. 33, line 3), wherein a body of said constant looping statement comprises a body of said variable looping statement, and wherein said body of said constant looping statement is only executed in the event that said determined condition is satisfied (Fig. 33, lines 3-4; and column 42, lines 10-17).

Claim Rejections - 35 USC § 103

13. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

14. Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biggerstaff (U.S. 6,745,384) in view of Schreiber (U.S. 6,438,747).

Art Unit: 2124

Per Claim 2 (Amended):

The rejection of claim 1 is incorporated, and Biggerstaff further teaches wherein said determining said condition comprises forming a logical "OR" of an initial condition within said initial expression of said variable looping statement and an exit condition within said exit expression of said variable looping statement (Fig. 33, line 3, "||" is the OR operator). Biggerstaff does not explicitly teach "AND". Schreiber teaches "AND" (column 16, line 53, "&&" is the AND operator).

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the method disclosed by Biggerstaff to include "AND" operator instead of "OR" operator using the teaching of Schreiber. The modification would be obvious because one of ordinary skill in the art would be motivated to verify that all the conditions are true.

Per Claim 10 (Amended):

This is a system version of the claimed method discussed above, claim 2, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Response to Arguments

15. Applicant's arguments filed on 9/22/04 have been fully considered but they are not persuasive.

In the remarks, the applicant argues that:

Art Unit: 2124

a) The Examiner contends that Fig. 33 discloses the elements of Applicant's claim 1.

However, in rejecting claim 1, the Examiner fails to provide any citations to the specification. On its own, Fig. 33 merely shows a nested for loop statement (Fig. 33, lines 1 and 2) including a conditional statement (Fig. 33, line 3). Fig. 33 does not illustrate a process or method.

Applicant's claim 1 is directed to a method that processes a variable loop statement to enable loop unrolling. Merely describing a statement that includes upper and lower bounds, a condition that is to be satisfied, or a nested conditional statement does not disclose the method of claim 1.

Fig. 33 does not show any step, action, and/or part of a method that includes determining an upper bound and a lower bound; does not show determining a condition that must be satisfied; and/or does not show *forming* a constant looping statement, all as recited in Applicant's claim 1.

Examiner's response:

a) Examiner strongly disagrees with applicant's assertion that Biggerstaff fails to disclose the claimed limitations recited in claim 1. Biggerstaff clearly shows each and every limitation in claim 1. In the previous Office Action, the Examiner had specifically pointed out in the Biggerstaff reference where the limitation of claim 1 is being taught. Currently, the Examiner is providing further clarification in the Biggerstaff reference. See the rejection above in paragraph 12 for rejection to claim 1.

In the remarks, the applicant argues that:

b) Further, the statement shown in Fig. 33 appears to be consistent with Applicant's definition of a constant looping statement. Thus, Fig. 33, line 1 does not show a variable looping

Art Unit: 2124

statement from which the upper and lower bounds for a loop index can be determined. It follows that, without showing a variable looping statement, Fig. 33, line 3 does not show conditions within an initial expression and an exit expression of a variable looping statement. Also, without showing a variable looping statement, Fig. 33, lines 1-4, does not show a body of a variable looping statement. Based on the above, claim 1 is allowable and reconsideration of the rejection of claim 1 is respectfully requested. Independent claims 9 and 17-19 recite limitations directed to processing variable looping statements. For the reasons described with respect to claim 1, claims 9 and 17-19 are allowable and reconsideration of the rejection of claims 9 and 17-19 is respectfully requested. Claims 2-8 and 10-16 depend respectively from claims 1 and 9 and are allowable at least by dependency.

Examiner's response:

b) Examiner strongly disagrees with applicant's assertion that Biggerstaff fails to disclose the claimed limitations recited in claim 1. Biggerstaff clearly shows each and every limitation in claim 1. The statement shown in Fig. 33 refers to *line 11* not line 1. Fig. 33, line 1 does show a variable looping statement from which the upper and lower bounds for a loop index can be determined, where *i* is the variable index that is increasing. In addition, see the rejection above in paragraph 12 for rejection to claim 1.

In the remarks, the applicant argues that:

c) With respect to claim 2, the Examiner recognized that Biggerstaff does not disclose forming a logical "AND". However, the Examiner contends that Biggerstaff discloses that

Art Unit: 2124

determining a condition comprises forming a logical "OR" of the initial condition and the exit condition and that it would have been obvious to form a conditional statement using the logical "AND" operator and that using the logical "AND" operator is an obvious variation. Applicant respectfully disagrees. The Examiner has provided no citation to Biggerstaff to show that Biggerstaff discloses forming a logical "OR". While the use of logical "AND" operators or logical "OR" operators is common in computer programming, forming a logical "AND" of an initial condition within an initial expression of a variable looping statement and an exit condition within an exit expression of the variable looping statement is not taught or suggested in Biggerstaff, or in any of the cited prior art.

The Examiner has taken Official Notice that it would have been obvious to form a conditional statement using the logical "AND" operator. As stated above, the use of logical "AND" operators or logical "OR" operators is common in computer programming. However, Applicant specifically recites that the logical "AND" is formed of an initial condition within an initial expression of a variable looping statement and an exit condition within an exit expression of the variable looping statement. The prior art does not teach or suggest Applicant's method of forming a logical "AND" and the Official Notice taken by the Examiner does not correspond the limitations recited in Applicant's claim 2. Based on the above, claim 2 is allowable and reconsideration of the rejection of claim 2 is respectfully requested. Claim 10 recites a limitation similar to claim 2 and is allowable for the same reasons.

Examiner's response:

Art Unit: 2124

c) Currently, the combination of Biggerstaff and Schreiber shows each and every limitation in claims 2 and 10. See the rejection above in paragraph 14 for rejection to claims 2 and 10.

In the remarks, the applicant argues that:

d) With respect to claims 3-8, the Examiner contends that Biggerstaff discloses determining whether said variable looping statement includes an increasing loop index value (col. 8, lines 38-50; Fig. 33). Applicant respectfully disagrees. In the citation provided by the Examiner, Biggerstaff describes the application of transforms to a sample statement $A = B + (2 * C)$, where A, B and C are matrices (col. 7, lines 33-40). Applicant submits that the sample statement does not correspond with Applicant's variable looping statement. It follows that the Examiner's citation does not teach or suggest determining whether said variable looping statement includes an increasing loop index value, as recited in Applicant's claim 3, or determining whether said variable looping statement includes an decreasing loop index value, as recited in Applicant's claim 6.

The citation itself does not disclose determining whether a loop index value is increasing or decreasing. Rather, Biggerstaff discloses applying a transform that replaces nodes on a tree representation of the above statement and adds an optimization tag to the replaced nodes. A replaced node contains a reference to an operand of iteration, which for each step of the iteration, takes on the value of each element of the corresponding matrix. The optimization tag indicates that nested "for" loops with separate index variables need to be used to access the elements of the matrix. Biggerstaff does not teach or suggest determining whether the index variables are

Art Unit: 2124

increasing or decreasing. As discussed previously, Fig. 33 does not show any step, action, and/or part of a method.

It follows that since Biggerstaff does not teach or suggest determining whether the index variables are increasing or decreasing, Biggerstaff does not teach or suggest determining upper and lower bounds based on whether the index variables are increasing or decreasing, as recited in claims 4, 5, 7 and 8. Based on the above, claims 3-8 are allowable and reconsideration of the rejection of claims 3-8 is respectfully requested. Claims 11-16 recite limitations similar to claims 3-8 and are allowable for the same reasons.

Examiner's response:

d) The Examiner has already addressed the applicant's arguments regarding variable looping statement in the Examiner's Response (b) above. As previously pointed out in the last Office Action, Biggerstaff teaches determining whether said variable looping statement includes an increasing loop index value (column 8, lines 38-50, AO system evaluate loops with index variables. Fig. 33, line 1 does show a variable looping statement, where *i* is the variable index that is increasing.). In the previous Office Action, claim 6 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Biggerstaff (U.S. 6,745,384) in view of "Official Notice". Applicant has failed to seasonably challenge the Official Notice. Therefore, the well-known statement, stated in the previous Office Action, Mailed on 6/23/04, par. 24, is taken to be admitted prior art.

Conclusion

16. Applicant's arguments regarding claim 2's Official Notice is taken to be a seasonable challenge. The Examiner has added the reference Schreiber (U.S. 6,438,747) merely as evidence of the prior well known statement.

17. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

18. Any inquiry concerning this communication from the examiner should be directed to Qamrun Nahar whose telephone number is (571) 272-3730. The examiner can normally be reached on Mondays through Thursdays from 8:30 AM to 6:00 PM. The examiner can also be reached on alternate Fridays.

Art Unit: 2124

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki, can be reached on (571) 272-3719. The fax phone number for the organization where this application or processing is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



QN
February 4, 2005

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